I-PWR-UP
Improving Pilot Weather Reporting and Use of PIREPs

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PIREPS: Pilot Reports

What are they?

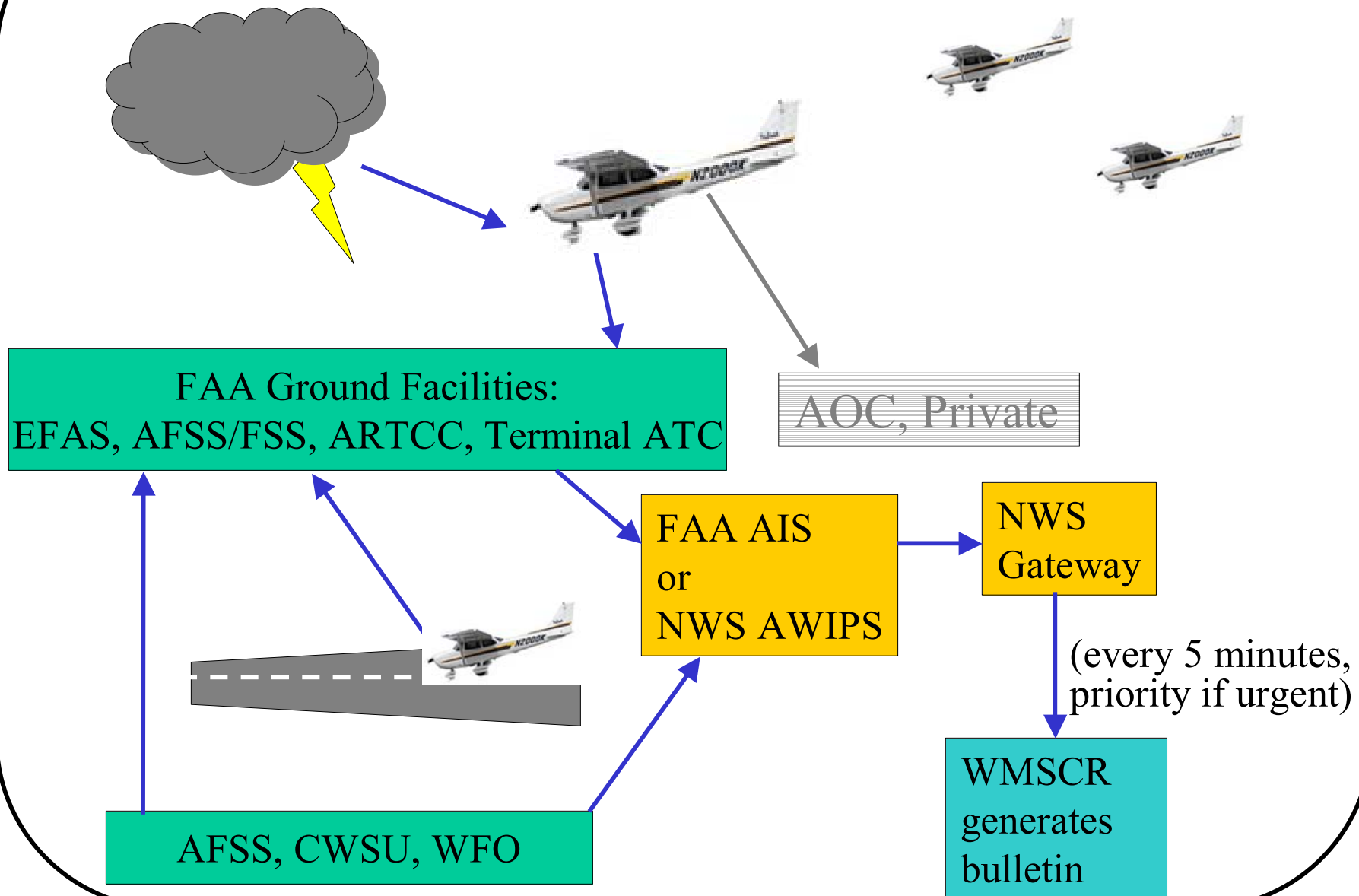Actual pilot reports of weather conditions as encountered

Example:

UA/OV FRR 275045/TM 1745 /FL330 /TP B727 /SK 185 BKN 220 280 BKN 310 /TA-53 /WV 290120 /TB LGT-MDT CAT ABAV 310.

Decoded: *(type, where, when, altitude, aircraft, conditions)*

Pilot report, Front Royal VORTAC, 275 radial 45nm, at 1745Z, flight level 330; Boeing 727; cloud base 18500 broken, tops 22000, second layer 28000 broken, tops 31000; air temperature minus 53 degrees Celsius; wind 290 degrees 120 knots; light to moderate clear air turbulence above 31000.
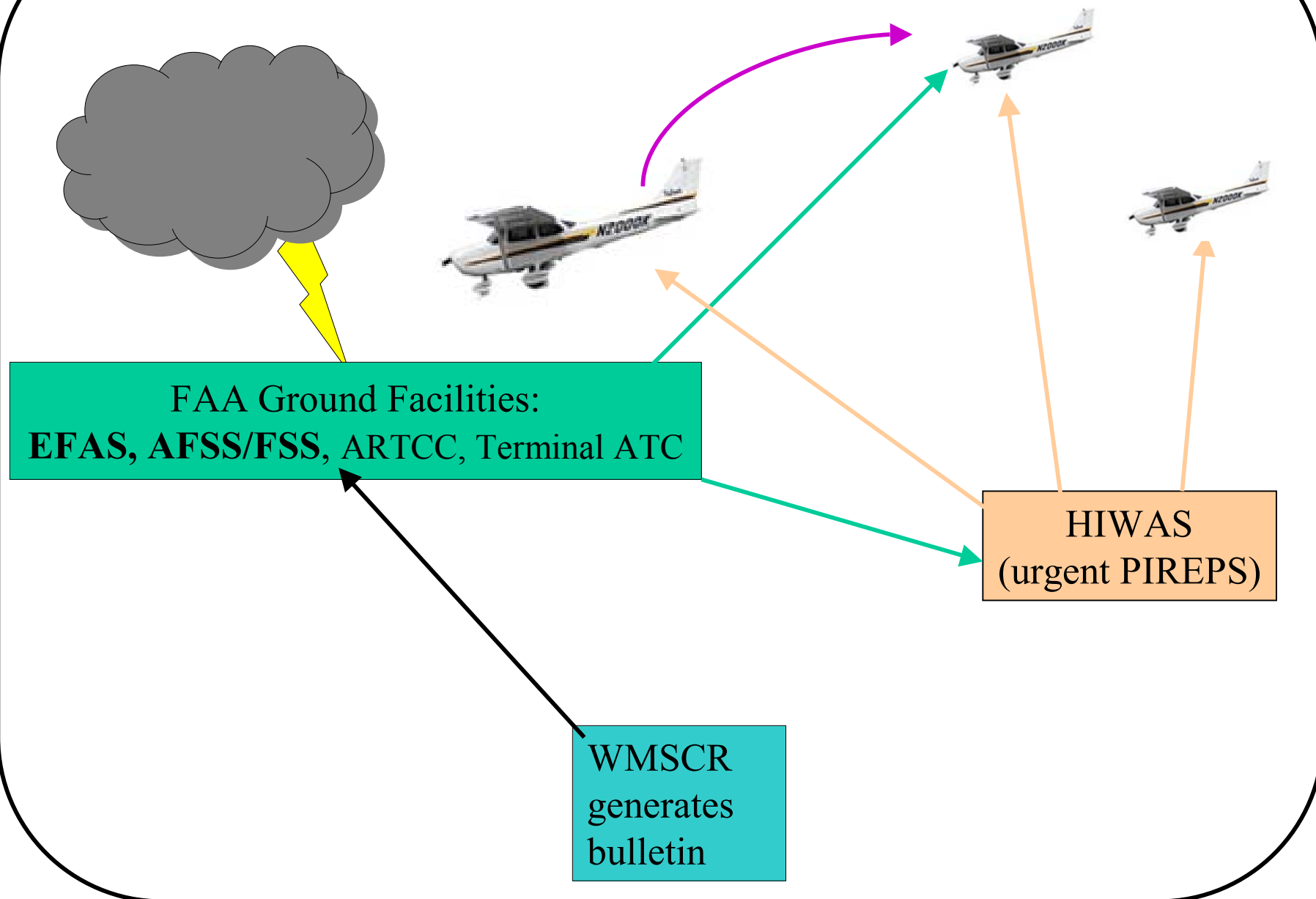
System Analysis: PIREP Input

FAA Ground Facilities:
EFAS, AFSS/FSS, ARTCC, Terminal ATC

AOC, Private

FAA AIS
or
NWS AWIPS

NWS Gateway

(every 5 minutes, priority if urgent)

AFSS, CWSU, WFO

WMSCR generates bulletin

System Analysis: Dissemination

FAA Ground Facilities:
EFAS, AFSS/FSS, ARTCC, Terminal ATC

HIWAS
(urgent PIREPS)

WMSCR generates bulletin

Value of PIPEPS

GA Pilots' Perceived Usage & Valuation Ratings *(NASA/TM-2002-211443)*

- – ~80% "very" or "extremely" important to preflight planning
- – ~76% "very" or "extremely" important to inflight decisions
- – Cited as one of 6 primary sources for inflight decisions (26%)
- – GA pilots with more experience valued more highly *(median 825 hours)*

AvWeb Survey

- – you get a better briefing when Pireps are available
- – invaluable... realtime information to compare with forecast
- – essential … the only source of actual information along route
- – especially for remote areas between wx reporting stations

Problems...

Giving

- Format has useless information and is not user friendly
- I'd do more PIREPS if it was easier.
- I can't explain my reluctance .... Maybe it's the fear of being inaccurate
- (on IFR flightplan) there simply isn't enough time to report a PIREP
- biggest constraint (is) the inability to reach any FSS, most of the time...

Getting

- I give them to ATC alot but usually these must end up on the floor as they never seem to get posted. This applies even with FSS. I land and check ….
- I work Flight Watch …(with) 61 airborne calls in 2 1/2 hours due to thunderstorms. ... I only had time to enter 2 pireps into the system.

Using

- Too sparse to be useful
- PIREPs need to be in plain english
- I rarely transmit .. good WX, but I need (that) most .. on the ground
- (take) with a grain of skepticism. Too many pilots mis-read the conditions...

Pleas for PIREPS

From Ground Side *(ASRS Callback, 1999)*

- Reminder to pilots to provide PIREPS

From Pilots *(AvWeb Survey)*

- "It's a safety net we all need."

- "We need more PIREPs!"

- "I WISH MORE PILOTS WOULD SUBMIT PIREPS --- How can we get them to do it?"

From external reviews

- NTSB Accident reports *(Roselawn, 1996)*

- FAA ATR-300 GA Summit recommendations *(1999)*

Motivation

Problems providing useful PIREPS
- Workload challenges when most needed
- Frequency priority to ATC when most needed
- "Clear Path" PIREPS not provided
- Errors: missing location, aircraft type, time

Problems getting PIREPS into the system
- Frequency priority to ATC -> given to ATC
- Workload challenges when most needed
- Errors: not entering information

Problems using PIREP information
- How old was that PIREP?
- Is it relevant to my aircraft / location / route?

Intervention 1: Providing PIREPS

Encourage Useful Content
- Weather cues -> severity, extent
- "All Clear" PIREPS
- Translation of physical features to coordinates
- Completeness check
- Additional information (TAMDAR, etc.)

Minimize Workload to Produce & Transmit
- Minimize content *(autoreport position, time)*
- Minimize memory load *(template, query system)*
- Minimize interface interaction *(1key "clear," voice)*
- Autotuning radio, datalink *(compressed voice)*

Maximize Temporal Usefulness
- Indication when PIREPS are needed from you
- Time tagging

Intervention 2: PIREP Ingestion

Ensure Content Complete / Correct
- Voice recognition audit
- Structured input

Minimize Workload to Enter & Transmit
- Auto-transmit compressed voice files for broadcast
- Auto-transcribed with acceptance
- Voice input
- Chorded keypad

Ensure PIREP coverage
- PIREP Situation Awareness Display View
- Alerts based on other wx to ask for PIREPS

Intervention 3: Using PIREPS

Phase 1: PIREP Presentation

- PIREPS Display *(aircraft, flight plan, mission, latency)*
- PIREPS Broadcast *(non-urgent)*
- PIREP-based Alerting

Phase 2: Fused Weather Hazard Presentation

- confirmation of hazards
- depiction of weather hazards
- depiction of safe areas

Summary

Providing PIREPS in flight

- Useful Content
- Workload
- Temporal Usefulness

PIREP Ingestion

- Complete and correct
- Workload
- Ensure PIREP coverage

Using PIREPS in flight

- PIREP Information Presentation & Alerting
- Fused Weather Hazard & Alerting